

Chemical Occurrences - February, 1998

Class 1:

None

Class 2:

Lawrence Livermore National Lab. - An employee was exposed to beryllium oxide powder; in part because powder was originally believed to be aluminum oxide.

Oak Ridge, Y-12 - Employees experienced headaches and nausea when exposed to mineral spirit fumes during floor tile installation. There was one lost workday case.

Other Occurrences of Note:

Nitrous Oxide at Rocky Flats ** SAR Concern (Hydrogen) at INEEL
Pressurized Hydrogen Line at Savannah River

Note: A minor change has been made in the way occurrences are date-sorted. In the past, reports were sorted into the month corresponding to "Discovery Date"; as of January 1998, reports will be sorted into months according to "Date of Notification Report". This minor revision will allow for quicker distribution of these Monthly Summaries without compromising comparison of report counts with past monthly values. Three reports are included in this month's data with a "Discovery Date" prior to February 1998.

A search of ORPS for occurrences having chemical safety relevance conducted for the month of February 1998 produced 37 reports representing potential chemical safety concerns. These occurrences are listed in [Attachment 1](#). There were six occurrences categorized as "Unusual" with the remainder identified as "Off-normal". The Office of Environmental Management (EM) was Cognizant Secretarial Office (CSO) for 21 occurrences, Defense Programs (DP) had 13, and Energy Research (ER) three. The CSO designation may change after the distribution of this monthly memorandum, and this change will be reflected in Quarterly and Annual Reviews.

There were two Class 2 occurrences reported during February. There were 15 Class 3 occurrences. [\(Class definitions\)](#)

Among the Class 3 occurrences, in addition to those noted previously, was a building evacuation due to a spill of silicon tetrachloride (potential to form hydrochloric acid) at LLNL. At Y-12, use of ethylene glycol in a closed coolant loop represented a potential USQ due to potential for reaction with nitric acid or hydrogen peroxide. Lithium was found to be improperly stored (in nitrogen instead of argon) at INEEL. Also at INEEL, two waste drums were discovered to be deformed indicating pressurization. At Pantex, mercury contamination spread from a small amount of liquid discovered in a sample bottle.

Summaries of Class 2 Occurrences:

Employee Exposed to Beryllium Oxide (DP): (SAN--LLNL-LLNL-1998-0012) On February 11, 1998, an ES&H technician observed a number of shards and pieces of material spread on the top of a

laboratory work table. The individual responsible for the work area was contacted to discuss the nature of the material. The individual stated it was aluminum oxide and subsequently caused some of the material to become airborne. After further examination, it was determined that the material was beryllium oxide. As a precautionary measure, the room was then sealed and the individual was taken to Health Services where he took a shower and his clothes were bagged. Nasal swipes were taken at Health Services as well as a swatch of his shirt. A preliminary analysis performed during the evening showed there was no beryllium on the nasal swipes, but beryllium was detected on the swatch of shirt and on some of the floor swipes. An Incident Analysis team is being formed. This occurrence is further discussed in Operating Experience Weekly Summary, 98-08.

Employees Exposed to Mineral Spirit Fumes (DP): (ORO--LMES-Y12SITE-1998-0008) On September 16, 1997, an employee reported that fumes from a floor tile installation process were causing employees to feel sick. Employees were instructed to report to the Y-12 Health Services Department, and to suspend the job pending Industrial Hygiene (IH) review. The employees complained of headaches and nausea and were evaluated by medical staff for exposure to mineral spirit fumes. Two were given an over-the-counter headache medicine, and returned to normal duties. The third was scheduled for a follow-up visit to Health Services due to a pre-existing respiratory problem which may have been aggravated by the fumes. A fourth was off-work, and was later classified as a "Lost Workday Case". The fourth employee also had a pre-existing condition, Chronic Berylliosis Disease, aggravated by the fumes.

Other Occurrences of Note:

At Rocky Flats (RFO--KHLL-771OPS-1998-0006), an acidic odor was detected by personnel performing line draining operations. A drain bottle had also filled with an orange colored liquid material. The oxalic acid which was to be drained from the line was expected to be a clear, colorless liquid. The job evolution was stopped; personnel placed the line in a safe configuration, and no further odor was detectable. An Industrial Hygienist performed air surveys of the area and the bottle. Room air surveys were normal; however, the Industrial Hygienist detected nitric acid fumes in the bottle. There were no reports of symptoms by personnel exposed to these fumes. All personnel who smelled nitric acid odor reported to the Industrial Health facility for an evaluation. A decision was made to sample the gas in the headspace of the bottle. Results indicated the presence of 22% free hydrogen in the sample. Management determined that all breaches of, or modification to, process lines containing fissile and/or reagent materials should be administratively secured.

At the INEEL (ID--LITC-TANO-1998-0002), an investigation determined that to prevent the potential concentration of hydrogen gas from accumulating near the ceiling of the spent fuel storage pool and creating a potentially explosive situation, the area ventilation system must be operational. The requirement to ensure operability of the storage pool ventilation system is not identified in the Authorization Bases or the Safety Analysis Report (SAR) for the facility. Each canister (containing spent nuclear fuel) is vented to the indoor atmosphere and there is a possibility of hydrogen gas being vented and concentrating near the ceiling of the facility. The facility does have an adequate ventilation system, however, there is no requirement to ensure the ventilation system remains in an operational status.

At Savannah River (SR--WSRC-LTA-1998-0005), during a critique of a previous hydrogen release, it was discovered that other work activities had previously occurred in this lab that might not have been controlled in accordance with requirements. Subsequent investigation determined that work had been performed on a 125-psig hydrogen line by research personnel in preparation for system testing. The hydrogen line was isolated but was not "controlled" by lockout/tagout prescribed methods. A follow-up

investigation into this event and related administrative controls of hazard energy for research activities is ongoing.

Additional information regarding these occurrences and others will be discussed in an upcoming Quarterly Review; some are currently summarized on this website. As occurrence reports are finalized, lessons learned will be communicated.

This report approved by

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Note:

A version of this report is distributed via e-mail either as a WordPerfect or a text file. Please contact **John Usher** (516-344-2096, Fax: 516-344-3957, E-mail: usher@bnl.gov) at Brookhaven National Laboratory to be placed on e-mail distribution. If you want to receive hardcopy, please contact John Usher who will make every effort to accommodate you.

Please feel free to use the other resources available on the DOE Chemical Safety Program homepage. The Internet address is http://tis-hq.eh.doe.gov/web/chem_safety/.